

(a) The image must be virtual and larger than the candle.
Only a concave mirror can produce such an image.
Pretend the focal point of the mirror is 20 cm from
the mirror:

$d_o = ?$
 $f = 20 \text{ cm}$
 $d_i = ?$

$$m = 2 = \frac{-d_i}{d_o}$$

$$d_i = -2d_o$$

$$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$$

$$\frac{1}{f} = \frac{1}{-2d_o} + \frac{1}{d_o} = \frac{-1+2}{2d_o} = \frac{1}{2d_o}$$

so $f = 2d_o \rightarrow$ place the candle 10 cm
from the mirror

$d_i = -2(10 \text{ cm}) = \underline{-20 \text{ cm}}$ \rightarrow the image
will appear
20 cm behind
the mirror

To verify that the image is 8 cm high, place the candle on a table 10 cm in front of the mirror. Observe the image in the mirror from a vantage point behind the candle. Put the ruler alongside the mirror to verify that the image is 8 cm high.

(b)

